

**Promoting Linguistically Diverse Conservation Science Education
in the Greater Caribbean Basin**



Garinagu Ethno-Translator Elmer Mauricio Enríquez with Garinagu & Q'eqchi' students in Escuela Nucleos Educativos Familiares Luban Awanseruni, Livingston, Guatemala

Robert C. Thigpen & Thomas Dean King, PhD

Marine Conservation without Borders

Who we are:

Marine Conservation without Borders

Marine Conservation without Borders (MCwB) is a 501 (c) 3 non-profit organization registered in the United States. MCwB was organized to create conservation biology educational instruments for the Caribbean region. Our first series is called *Treasures of the Caribbean*. *Treasures* is a collection of marine conservation science curriculum designed to teach fundamental conservation science concepts in the coastal communities of the region. Our first materials are being created for a secondary school reader.



Our approach to marine science conservation education is unique and differentiated from other science and environmental conservation curriculum because our publications are designed to communicate concepts in a locally relevant context for the diverse learning communities of the region. This means that our materials will deal with conservation issues that these communities face in their daily lives using examples of flora and fauna with which they are familiar. Most similar attempts

to promote conservation education and environmental sciences have seen limited success due to instructional design laden with unfamiliar terms that learners often reject.¹ These designs do not account for linguistic relevancy for learning communities.² Another aspect of context is that we will use the home language of the communities that we serve. When we use the home language to teach conservation science concepts learners benefit from being able to use terms and names of things that they know from their own experience in their environments.

Relying solely on a national language of instruction (LOI), which may be filled with unfamiliar words and concepts, learners may not feel as if the information they are studying belongs to them.³ Using a bilingual strategy enables these materials to connect readers' traditional ecological knowledge (TEK) with other knowledge systems, specifically that of conservation biology. In turn, this connection enables the reverse. As conservation biology concepts become localized for speakers of indigenous languages, the locally relevant terms and concepts of communities' TEK become more accessible to scientists and educators whose knowledge may be limited to that of conservation biology. This connection builds a bridge allowing us to introduce new terms and concepts within a familiar and recognizable context for more learners and stakeholders in natural resource communities. This foundation expands local lexicons and TEK whereby indigenous speakers have new tools to learn about and engage in discussions of topics such as micro-plastics, climate change and the function of marine protected areas.

*"The Maya strive to live in harmony with all the elements of the universe. Each and every one of these elements is important for our survival. Marine Conservation without Borders is also aware of the importance of living in harmony with nature, so they have embarked on an ocean literacy project to create bilingual conservation biology teaching materials that are available in the students' first language. This project ensures a better understanding of the curriculum content and a more positive attitude towards the subject."*⁴

Felicita Cantun--Puks'ik'al Maya Group

¹ Ellis et al., 2017

² Ellis et al., 2017

³ Nair, 2015; UNESCO, 2003

⁴ Thigpen and Cahun, 2018

Our mission:

Why design locally relevant bilingual conservation science education?

The Caribbean basin is an area of tremendous cultural and linguistic diversity. There are numerous colonial influences as well as a myriad of indigenous groups. Throughout the region European colonial languages are the official languages of instruction (LOI); these LOIs are also used as the primary, and in most cases only, language in the countries' national education systems. However, these many indigenous groups use an equally diverse set of non-colonial languages. While these non-colonial languages are spoken in the streets, shops, and homes by millions of people throughout the greater Caribbean region, they are mostly ignored by the education systems of these nations.^{5 6}

It's difficult to classify these languages as a set or type distinct from the various LOIs because of their different origins and communities of speakers. When we talk about and describe these languages in general, we use terms like local languages, indigenous languages, mother tongues, home languages, etc. We use these terms interchangeably here, yet generally consider each falling into these types:

Indigenous languages of first peoples of the Americas, such as the Maya or the Wayunaiki.

Creole languages are spoken throughout the country either as an L1 or L2 language by all linguistic groups, examples include Belizean Kriol (English Creole) and the Kreyòl (French Creole) of the eastern Caribbean.

Fusion languages like Garifuna, first emerging from intermarriage between the Arawak and Caribe, later evolving with colonial influences followed by changes coming out of intermarriage among these indigenous communities and shipwrecked African slaves.

Children raised speaking their mother tongue in the home face substantial disadvantages when they begin their formal education. They find themselves thrust into a mono-linguistic education system solely oriented and founded on a language with which they may be familiar, but in which they are not as experienced and confident because it is not the language of their community and home.⁷ This disadvantage is exacerbated since in most cases there is no bridge between the language students use to learn at home and the language used to instruct while teaching subjects at school. Moreover, recent research suggests that non-native speakers of an LOI, where English or Spanish is a secondary language to another local indigenous language, will often times reject new ideas when they are not presented in their home language.⁸



"I am Mopán and can always recall my first day in school where the mode of instruction was/is in English, and yet not a word of English did I know."

Francisco Cal — Belize Ministry of Education

⁵ Notable exceptions are Kreyòl Ayisyen in Haiti and Papiamentu of the Dutch Antilles.

⁶ UNESCO, 2003; Simons and Fennig, 2018

⁷ Nair, 2015

⁸ Ellis et al., 2017


UNESCO Policy Paper #24, *If you don't understand, how can you learn?*, outlines key needs in overcoming obstacles while calling for the development of “linguistic diversity within educational systems.”⁹ Additional recent research suggests that people are more likely to reject new information in their second language when they perceive the information as having a negative bias, especially toward their language or culture.¹⁰ This may be exacerbated when new fishing or environmental regulations are proposed that are not fully explained or understood. The UNESCO Policy Paper #24 calls for locally relevant languages to be incorporated into education systems where such “local languages” are widely used throughout communities outside the classroom. Three key challenges frustrate efforts to implement this policy recommendation:

- **Teacher Recruitment**
- **Curriculum Development**
- **Provision of Teaching Materials**


Marine Conservation without Borders is creating a curriculum development methodology to produce bilingual marine conservation biology educational instruments that meet the challenges identified by UNESCO and that align to regional Ministry of Education standards.¹¹ The value of our design is that it enables instructors to use either of the languages in the bilingual format to teach the lesson; and, in turn, the student can follow, learn, and study in her/his mother tongue, in the LOI, or in both. This facilitates two learning objectives: the student will be able improve reading comprehension in the LOI and in their mother tongue while also improving learning comprehension of the subject and topics being taught.¹²

This type of language gap presents a structural and institutional barrier in students learning access and equity in education. This is particularly acute in the sciences. One area of the sciences where MCwB sees a specific need in the communities of the Caribbean is in marine biology, ecology, and conservation science. We are unaware of any country in the region that is teaching fundamental marine conservation science concepts in their school systems in a way that engages and promotes cultural and linguistic heritage and a community's biocultural diversity.¹³ This is of concern because millions of families' food security is dependent upon healthy marine ecosystems. We endeavor to enable the indigenous and historically marginalized language groups in this region by providing the tools to transform marine conservation science education through delivery of key core subjects in locally relevant bi-lingual curriculum. Initially, this curriculum will be available for download at the MCwB free [Digital Library](#).

A'inmajia Sukua'ipa Palaa Malüjaayesatka
Shi'iyatüin



Tü wunu'ulia Junna münakat
nuku'umajala Robert C. Thigpen nüma
Aminta Peláez Guariyu, Alvaro Andrés Moreno Munar
Aku'majaka süyaakua shia Madison Hetzel



A'INMAJIA SUKUA'IPA PALAA MALÜJAAYESATKA WAYA
IMA'AKAYA SA'IN JIAKANA!

⁹ UNESCO, 2016

¹⁰ Ellis et al., 2017

¹¹ UNESCO, 2013; UNESCO, 2016; Nair, 2015; Ellis et al., 2017

¹² UNESCO, 2003

¹³ Maffi, 2014

Our focus:

Building marine conservation science education tools by, of, and for the people

Marine resources supply significant value to the countries and coastal communities of the greater Caribbean Basin; providing food security, livelihoods, employment, and business opportunities for people across the region. Moreover, a large part of the catch is a high-valued export commodity generating direct and indirect economic stimulus beyond their communities. Caribbean marine resources supply international value chains that are the foundation of relationships with international consumers in Europe, North America, and Eastern Asia.¹⁴ It is imperative that these resources be protected from over-exploitation and used in a sustainable manner so that these marine products, and the numerous livelihoods and enterprises dependent on them, will be available in the future.



One way to achieve this goal is to teach fundamental marine conservation concepts across the region with locally relevant linguistic context placing local home languages at an equal footing with LOIs. Locally relevant topics presented in an accessible format will draw people into conversations about conservation needs and practices. An equally important component of this endeavor is the traditional ecological knowledge (TEK) of the people working and living within these systems. This specialized local knowledge is a valuable resource to support conservation efforts, it is vital that it not be ignored.¹⁵

Tapping into the value of these communities' TEK is difficult. Blending local languages and TEK with conventional scientific materials previously limited to colonial LOIs elevates engagement as people feel more represented and part of the dialogue. An education curriculum to teach these fundamental concepts will also protect and strengthen these foreign, national and local economic structures that are dependent upon healthy marine ecosystems.

The challenges to facilitate more engagement among communities of stakeholders arise from language, cultural, and institutional barriers between local and extra-local contexts, between people and institutions from the local setting and those from national and international places outside the community. The potential communication issues are numerous. Our work aims to address some of these by working with our ethno-translators, experts in specific realms of a culture group's intellectual heritage, to develop new tools (locally relevant publications) and new words (locally constructed neologisms) to help bridge some of the communication challenges. While our focus on developing bilingual marine conservation science educational materials is for students and school settings, the people and institutions we are engaging is creating a space to elevate and extend these new ways of communicating beyond the classroom, into people's lives, and into community conversations about the issues and problems they face in a rapidly changing world.

¹⁴ Monnereau, 2012

¹⁵ Snively and Corsiglia, 1998

The opportunity we see lies in working with these various, often marginalized, language and cultural groups to provide new educational experiences for young people. This approach will equip them with new tools and resources to better understand and communicate about their local marine conservation situations *in their own language and on their own terms*.¹⁶ Many of these languages simply do not have the terms and concepts within their traditional ecological knowledge repertoire, which limits the range of communication possibilities both among speakers of the local language and when translating across languages with others from outside these communities. In this way, these TEK systems and their languages do not have terms and concepts to account for

new negative impacts to their environments and the scientific documentation for fully understanding of them.

The product of this work will entail the development of locally relevant bi-lingual education resources focused on fundamental marine conservation concepts¹⁷, such as:

- **resource over-exploitation**
- **climate change**
- **micro-plastics**
- **destruction of nursery and juvenile habitats**
- **the function of marine protected areas**
- **the onset of invasive species, such as the lionfish**

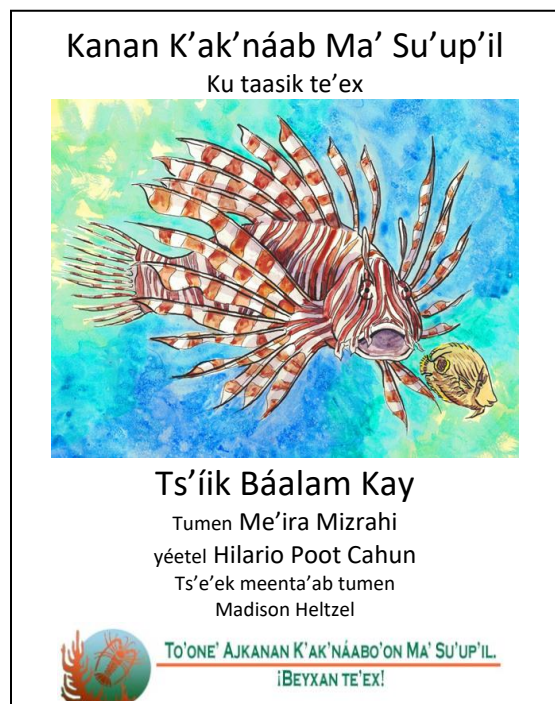
This new learning framework lays the groundwork for improved communication for people facing these challenges and their impacts to their communities and livelihoods, possibly having positive effects on communication with outsiders about conservation and policy concepts. Through partnerships with local ethno-translators, our methodologies provide a framework to infuse terms and concepts from contexts within other systems of knowledge (conservation biology) using different languages (European/colonial) into

these languages in locally relevant and meaningful ways. These peoples, their cultural systems, and institutions are fully capable to learn and adapt.

The opportunity we see is in focusing on the development of neologisms with ethno-translators for languages not having specific and locally appropriate concepts to describe the many new problems in their mother tongue, specifically the specialized concepts familiar in the language of science. In many cases, this is where we see people borrowing words from other languages. And while this is one suitable way to accommodate new ideas and incorporate them into one's language, we are finding value in working with ethno-translators to develop neologisms to create words in the languages for these "borrowed" concepts. Learning requires communication and sharing of ideas and adapting requires that these take hold and persist over time. Our work facilitates this process, removing barriers that inhibit successful conservation policy outcomes. Marine Conservation without Borders is building bridges between the language of science and the languages spoken in the homes, shops and streets of the greater Caribbean basin.

¹⁶ UNESCO, 2002

¹⁷ Mizrahi and Cahun, 2019



Our relationships:

Working locally makes our work relevant, new global communities make it possible

The education materials we create are made possible through the collaboration of a diverse interdisciplinary group of women and men sharing a vision to protect the ecosystems and the international value chains on which Caribbean communities rely for livelihoods and food security. Our work is made relevant by engaging with the various communities and demonstrating the value we place on their knowledge, culture, and traditions through sharing the language of science in context and in their mother tongues.



The people living and working closest to these ecosystems are on the front lines of stewardship and have vested interests in conserving the resources within them. They also have intimate, experiential, and specialized knowledge of these environments; embodied in their IH and TEK. By building relationships with local community groups and showing interest in the value of their local knowledge we are positioned to build new relationships between the local communities and other project collaborators. This is the space in which our methodologies unfold and begin the work of expanding TEK by developing science and conservation concepts with them, for them, in their own languages and in the context of their environments.

It is vital to our mission that we drive our work through local partnerships to maximize local community engagement and promote appropriate local voices in the translation, neologism development, and publication/production processes. Our collaborative community includes marine and terrestrial scientists, ethno-translators, artists, aqua- and mari-culture professionals, photographers, fisheries economists, educators, indigenous peoples, geographers, chemists, linguists, cultural anthropologists, musicians, ethno-educators, natural resource managers, and fishers who have all joined together with the single purpose of creating conservation biology educational instruments for these underserved linguistic groups of the Gulf of México, the greater Caribbean basin, the tropical western Atlantic, and beyond. People working for or affiliated with several regional institutions have contributed generously of their time to our projects. We have established or are in the process of establishing formal relationships with many of these institutions. This work is not possible without these people, institutions, and the relationships we have built with them.

*“Growing up in Seine Bight village, Belize my grandmother would go fishing every day to provide food for us. Today the fish are fewer and the fishermen have to travel farther & work harder to catch less fish & lobster. The sea has always been the life blood of the Garinagu by feeding and protecting us. The sea is an essential part of our spiritual well-being. With the challenges of overexploitation, climate change and plastic pollution it is time for us to protect the sea that has given us life for so many generations.”*¹⁸

Au le Mámaga — Garifuna American Heritage Foundation United

¹⁸ Thigpen and Bermúdez, 2018



Collaboration partner organizations

Antonio Busiello Photography
Appalachian State University
Archive of Indigenous Languages of Latin America
Belize Fisheries Department
Bible Translation & Literacy (EA)
Blue Ventures
Centro de Desarrollo Ambiental y Humano
Colectiva Wainpira
Colegio de la Frontera Sur
Garifuna American Heritage Foundation

Institute Colegio de la Frontera Sur
James Cook University
Kenya Marine and Fisheries Research Institute
National Kriol Council of Belize
Puks'ik'al Maya Group
Refugio de Vida Silvestre Laguna Urpiano
Úara Garifuna
Universidad Intercultural Maya de Quintana Roo
University of Nairobi

Together we are Marine Conservation without Borders and now you are too!

Our curriculum:

Bilingual marine conservation science education designed for specific contexts

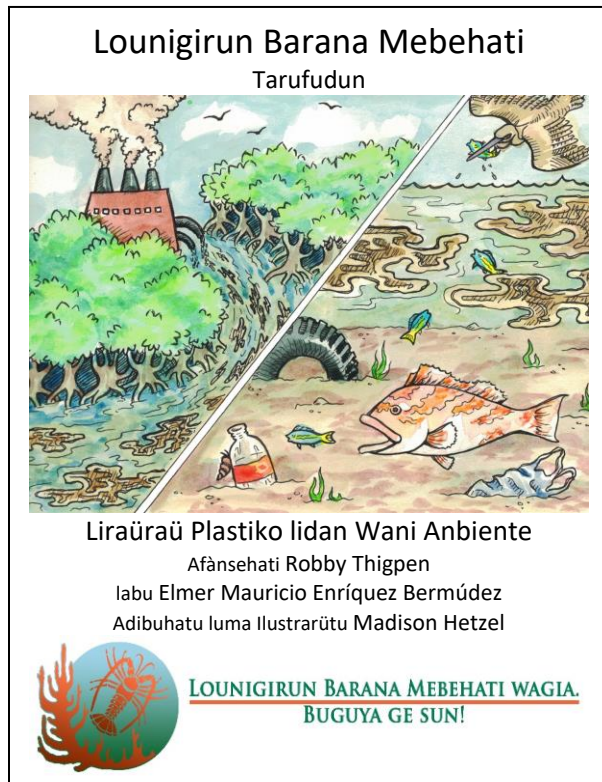
Translating scientific constructs into what are traditionally oral languages is no small task. First, there is no body of work to reference and there are no methodologies for creating the types of scientific materials we are producing. Through conversations with fishers, poachers, educators, and resource managers in the Caribbean; supplemented by literary research and fieldwork in the region, it became clear there was a significant gap in science and conservation education and the extent to which important information and knowledge was reaching rural and marine communities. The solution became apparent, to produce educational tools that blended knowledge systems of science and local communities TEK to better reach a wide array of learning communities.

Having framed up our argument and case, but not yet sure how to “do it”, we set out to produce the first bilingual marine conservation book. After many months working solely with volunteers we have now completed our first eBook, *Mangrove Ecosystems/Tü wunu'ulia Junna münakat*¹⁹ in Wayuunaiki. While producing these first books, we simultaneously worked on developing and refining a methodology and protocols to be adaptable to any language group while also being standardized and repeatable to create a consistently effective and relevant end product. Each of these initial bilingual eBooks will be released with the LOI for a target country and the local voice of these communities. The first materials in development are currently available in these languages: Maya (Yucatec), Kriol (Belize), Garifuna and Wayuunaiki. We are starting with two colonial languages: English and Spanish; and will be expanding to Portuguese and French soon. The initial booklets comprising the *Treasures* collection are designed for secondary school readers. The second title we will release is *Macro-Plastics in Our Environment/ Liraüraü Plastiko lidan Wani Ambiente*²⁰ in Garifuna; to be followed by a bilingual dictionary of scientific terms and descriptions of flora and fauna.²¹ Our plans involve validating and refining our methodology through each iteration of developing our next books and topics, develop said next readers, and operationalize how to support educators delivering the curriculum in their classrooms. You can read more about our plans after the country profiles below.

¹⁹ Thigpen et al., 2018a

²⁰ Thigpen and Bermúdez, 2019

²¹ Thigpen et al., 2019b



*"It allows us to embrace our language and understand and comprehend these concepts as if they were our own. Learning from a book made for a Creole audience will be great. There won't be any barriers for not understanding."*²²

**Celeste Castillo — Primary Education Student,
University of Belize**



The places, languages, and people around which our work has begun

The motivation for our work originated in Belize, where Robby first began developing his interest in marine science and conservation education. As the idea for the *Treasures* collection matured, Robby had already established deep relationships with people and communities in Belize and started the long and patient work of building a network of partners through Central America and the Caribbean. It's within this geographic footprint where we have decided to focus our work. The common link among these settings is the presence of one or more indigenous or creole language communities who use that language primarily and their home countries LOI is their secondary language. The countries and language communities described below are a picture of our current state (September 2018) and is ever changing. Each of the country and language sections below will give you a flavor of where we are at and where are going in the near term. We welcome all language communities to join our project, so if your country/language is not here, let us know if you would like to join our work.

*"The Wayuu people, like all first nations, have survived culturally thanks to their strong bond with nature that has protected us. When we raise our voice with allied organizations it is easier to take care of this unique place that our planet has given to us. Marine Conservation without Borders is one of our allies, it is a protector of dreams that rise from other places and other languages and join with the dreams and hopes of the Wayuu. Marine Conservation without Borders carries a message of hope, an invitation of solidarity with nature of which human beings are only a small part."*²³

**Sünüiki laülaakat Mari Juseepa Epieyuu
— Mma Kasuushimana, Kolompia**

²² King, 2018

²³ Thigpen et al., 2018c

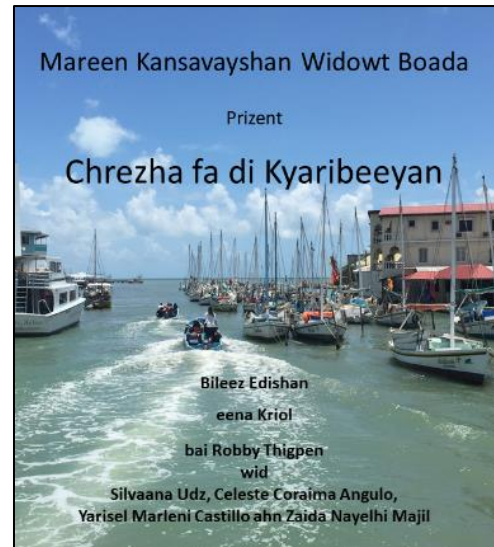
Belize:

English with Kriol, Garifuna, Maya

Belize sits on the south eastern base of the Yucatán Peninsula. It is bordered on the north by México, Guatemala to the west, and the Gulf of Honduras to the south. Its eastern border is the Caribbean Sea and the Meso-American Barrier Reef (MAR), the second longest barrier reef on our planet and a UNESCO World Heritage Site. Belize, formally British Honduras, was the only British colony in Central America. The LOI is English, however, the lingua franca of the country is Belizean Kriol.

Belize is home to eight languages. They are English, Kriol, Garifuna, Kekchí (Maya), Maya (Yucatec), Mopán (Maya), Plautdietsch and Spanish. Currently, we are creating bilingual educational instruments for Belize in Maya (Yucatec), Garifuna, Mopán and Kriol paired with the LOI—English.²⁴ All Belizean linguistic groups are welcome to join our project.

Belize Kriol is an anglicized creole that also has Spanish and indigenous influences. It is the language used in the fishery and in many other commercial sectors. Kriol is spoken widely and used throughout the country. We are working with Silvaana Udz and Ms. Myrna Manzanares of the *National Kriol Council of Belize* along with Celeste Castillo, Zaida Majil, and Yarisel Castillo to create these materials. Using Kriol allows us to teach about the marine ecosystems and conservation science topics using names and words that the fishers recognize and understand as opposed to the English names and words that may be unfamiliar. Our *Mangrove Ecosystems* book *De Mangro Dehn*²⁵ is the first scientific literature written in Kriol.



*"I think it helps because people feel you really are talking to them...to their hearts not just their minds, also, it facilitates understanding even more...It is another tool to reach out to people in a way that respects their home language and makes them more ready to internalize di information."*²⁶

Silvaana Udz — The National Kriol Council of Belize

²⁴ Simons and Fennig, 2018

²⁵ Thigpen et al 2018c

²⁶ King, 2018

Colombia:

Spanish with Wayuunaiki

Colombia is the northern most country of South America and the only South American country to share a border with Central America. Colombia has coasts in the southern Caribbean and the Pacific Ocean. It shares a border with Central America via Panamá. The South American countries that share a common border with Colombia are Brasil, Ecuador, Perú and Venezuela. Spanish is the principal LOI.



Colombia is home to more than 95 indigenous languages. There is also Colombian sign language, Spanish, English, and Islander Creole (San Andres). Some of these indigenous languages have no L1 speakers, some are in danger of extinction, and others have become extinct. With the decline and loss of these languages, the traditional ecological knowledge of these people is also at high risk for loss...forever. However, some of these languages are holding strong and in a period of revitalization.²⁷

We are working with Aminta Peláez Guariyu a Wayuunaiki ethno-educator of *Colectiva Wainpiria* and Alvaro Andrés Moreno Munar of *Universidad de Bogotá Jorge Tadeo Lozano Corpescaribe-SENA* to bring scientific terms and concepts to the Wayuunaiki people of the Guajira Peninsula in their language. Wayuunaiki is a developing language and is found in northeastern Venezuela and southeastern Colombia; it is a major Arawak language. The Wayuunaiki are a matrilineal society and Wayuunaiki is one of the few languages whose speakers have resisted the coopting influence of European languages into their own. Through our project, we can bring the concepts of science to their language on their terms, thereby promoting their intellectual heritage and engaging their communities in important discourse and dialogue concerning environmental conservation.



"I self-identity with this research and feel satisfied that the indigenous languages are treated as important as every other language in the world in this project. It is an invaluable recognition of our local thoughts and knowledge."

Aminta Peláez Guariyu-Colectivo – Colectivo de Jóvenes wayuu Wainpirai

²⁷ Simons and Fennig, 2018

Guatemala:

Spanish with Garifuna

Guatemala is a Central American country and part of the Mesoamerican Reef (MAR) region; bordered to the north by México, to the east by Belize, and to the south by El Salvador and Honduras. Guatemala has a coast on the Pacific Ocean and a small coastal area on the Caribbean Sea, where you will find the Garinagu community of Livingston.

The LOI of Guatemala is Spanish. Guatemala is also home to over 25 languages. Many of these languages have no known L1 speakers and are in danger of extinction. The Garifuna language is found on the Caribbean coast from Puerto Barrios and Livingston. The 2003 census indicates that there are less than 4,000 L1 Speakers in Guatemala and the language is considered threatened.²⁸ We are working with the Garinagu to give these seafaring people conservation biology materials in their mother tongue. Our work in this region is a new resource to help protect and revitalize this language. Collateral positive affects coming from this work may also safeguard the traditional ecological knowledge and cultural heritage of the Garinagu, so it too will not be lost to history.

Garifuna is also spoken in Belize, Honduras, Nicaragua, and Saint Vincent. We are working with Elmer Mauricio Enríquez of the *Úara Garifuna* and Rony Figueroa and Cheryl Noralez of the *Garifuna American Heritage Foundation United* to bring the language of conservation biology to the Garifuna people. Our materials are the first science books ever created in Garifuna.

We are also working with our colleague Mildred Fabiola Corona Figueroa to create conservation biology materials for the L1 Spanish speakers of the region. The Spanish materials will also be presented in MCwB's bilingual format, with the accompanying language of English.



*"I self-identify with the project because the project takes into account the culture and language of the Garinagu and our knowledge of the sea in their plans."*²⁹

Elmer Mauricio Enríquez--Úara Garifuna

²⁸ Simons and Fennig, 2018

²⁹ King, 2018

Honduras:

English with Garifuna and Inglés de Isleños

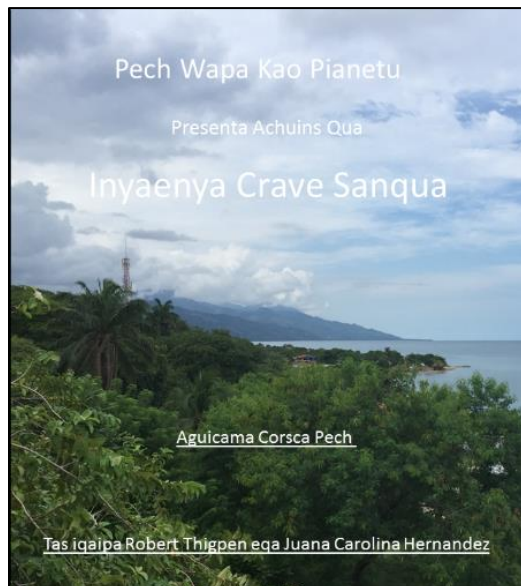
Honduras is at the southern end of the MAR system. It is bordered on the north and west by Guatemala and El Salvador and on the south by Nicaragua. Honduras has access to the Pacific Ocean by way of the Gulf of Fonseca. Honduras has a long north coast on the shores of the Caribbean Sea. Its off-shore waters contain the Bay Islands which are home to English speakers, the primary language of the Bay Islanders is Inglés de Isleños, an English based Creole not unlike the Kriol of Belize. This is a unique situation in that Spanish is the LOI for Honduras. In this area, there is a resistance of sorts to Spanish "being forced on" some segments of the population. Therefore, our first work will be to introduce the conservation science topics in English and Inglés de Isleños, with the possibility of a Spanish/Inglés de Isleños edition in the future.



Honduras is home to about 10 linguistic groups. Like the other countries in which we are working, some of these languages have no known L1 speakers and are in danger of extinction. Spanish is the LOI. There are many Garifuna communities along the north coast for which we are creating conservation science materials.

A couple of the Honduran language groups we want to include are the Pech and Miskitu. The Pech are historically an inland people group, however there is one Pech community near Trujillo, just a short walk from the Caribbean.

The Miskitu people reside primarily in the Gracias Dios Department on the eastern coast of the country as well as on the east coast of Nicaragua. The Miskitu have a big impact on the fisheries of the Caribbean and are an important asset to the international value chains that are supported by healthy Caribbean ecosystems.



"I think they [MCwB] will help people feel more empowered about their resources and create a sense of pride. It will contribute to preserve the language that is only spoken at home, but not in public schools."

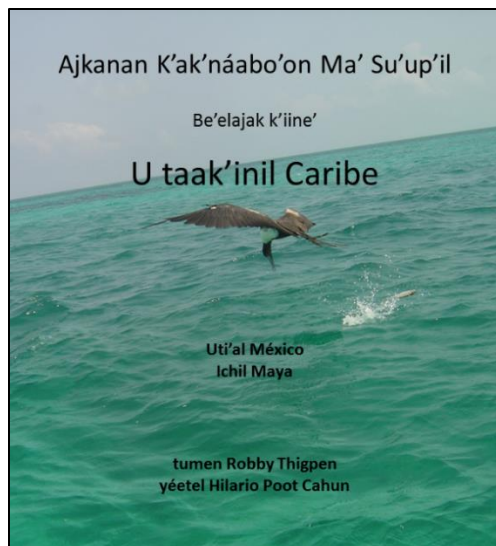
Grazzia Matamoros Erazo--Marine Biologist Honduras

México:

Spanish with Maya

México is home to many, many languages. The LOI is Spanish. The largest indigenous language being used today is Maya (Yucatec). Though there are many languages that are a part of the Maya family of languages the speakers of this language refer to their language as Maya. Yucatec is a term that linguists use to delineate it from the other Maya languages.³⁰

We are working with Hilario Poot Cahun with the *Universidad Intercultural Maya de Quintana Roo (UIMQRoo)* and with Ms. Felicita Cantun of the *Puks'ik'al Maya Group* of Belize to bring the language of science to the Maya on their terms.



We are also working with our friends in Tabasco. We are Very happy to have our friends and colleagues from *Universidad Juárez Autónoma de Tabasco*: Arturo Garrido Mora, Francisco Felix, and Yessenia Sánchez.

*"Western [science] concepts can be difficult to understand. This is a better way, it takes our local knowledge and treats it like it is important."*³¹

***Hilario Poot Cahun -
Universidad Intercultural Maya de Quintana Roo***

Panamá:

Spanish with Guna

Panamá is home to more than a dozen languages; of which, ten are indigenous. Spanish is the LOI for Panamá. There are also French and English Creoles.³² Panamá's eastern border is shared by Colombia and is thus connected to South America. The western border is with Costa Rica. It has Pacific and Caribbean coasts. We would be remiss not to mention the Panamá Canal. Ships enter the canal from the Caribbean at Colón at Gatún Locks and exit the canal into the Pacific at Mira Flores Locks at Panamá City.

³⁰ Simons and Fennig, 2018

³¹ King 2018

³² Simons and Fennig, 2018

We are working with Geodisio Castillo and the *Centro de Desarrollo Ambiental y Humano* to create marine conservation biology educational instruments in Guna for the Guna Yala of Panamá. The Guna are known for having an economy somewhat independent of the Panamanian economy. Their economy is based on agriculture, clothing manufacturing and fishing. The Guna have a long tradition of international trade.



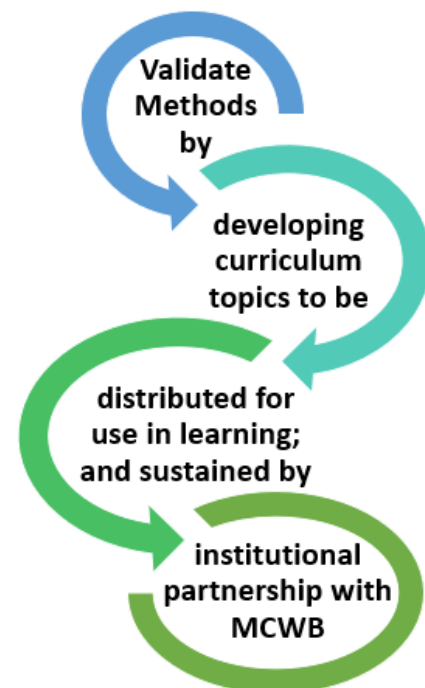
Our plan:

Validate and baseline the methodology, launch Treasures to classrooms

We envision the *Treasures* collection to be used in diverse settings by multiple audiences in the classrooms and communities of the Caribbean and beyond to positively impact the lives and livelihoods of families reliant on the sustainability of marine ecosystems and the resources within them. The *Treasures* collection is our plan to fulfill this vision. Our next steps are to further validate our methods for producing the curriculum and learning how best to get the materials into people's hands to use, test, learn, and improve. To accomplish these steps, we will develop and test the foundational topical units comprising *Treasures* curriculum and build the institutional capabilities to sustain relevance and utility of marine conservation science and TEK in education and practice.

Validate methods by Developing Curriculum

We have designed a method to develop a functional and effective bilingual marine science conservation curriculum. Up to now we have been learning as we go, refining the protocols and process of our methodology. Now we need to test and refine it to assure its efficacy in achieving marine science conservation education goals



tailored to specific linguistic and cultural communities. To accomplish this, we will produce a repeatable and standardized process to develop and translate the curriculum units. Using our initial baseline procedure, we'll standardize the scope and repeatability while producing additional curriculum units. We have started this process already, having completed the first *Treasures* chapter with several others through initial phases of development. We are eager to maintain our momentum and prioritize the depth and breadth of work required to complete the *Treasures* collection. Our approach is to iterate, to start small and deliver functional units of curriculum. Now that we have our first units completed, we are prepared to establish a baseline of the methodology and template for the curriculum readers.



The *Treasures* collection will eventually contain roughly 25 topics, mostly focused on marine species, ecosystems, and issues and concepts relevant to coastal communities throughout the Caribbean. Some will focus more generally on conservation practice, education, and integrating different types of knowledge (TEK and Conservation Biology) within marine environments. We will develop seven topical readers for the *Treasures* pilot curriculum to set our methodological baseline and begin testing the curriculum's delivery effectiveness. Our pilot set of topics will include:

- ***Mangrove ecosystems***
- ***Invasive Species: Lionfish, Plecos***
- ***Sea Turtles***
- ***Macro-Plastics in Our Environment***
- ***Point Source Pollution***
- ***Caribbean Spiny Lobster***
- ***Climate Change***

For each topic we will develop baseline instructional curriculum units. The baselines are input to our ethno-translation process. As we develop partnerships with interested communities, we work in identifying and training local experts in language, education, and TEK for training in our ethno-translation process. In addition to the topical readers, we will develop a Marine Science Conservation Dictionary to accompany the *Treasures* collection. This first edition will include scientific and TEK terms with neologisms relevant to the initial topics and be revised and extended as the remaining topics are developed. Community specific curriculum for these pilot topics will be developed in partnership with project collaborators representing these cultural language groups:

- ***Maya (Yucatec)***
- ***Kriol (Belize)***
- ***Mopán***
- ***Garifuna***
- ***Wayuu***

Distribute the curriculum and learn with partner communities

We have a pilot curriculum started. We are now focusing on putting it to use in the pilot language communities above. A key aspect of our implementation plan is to bring the representatives of the curriculum development team to workshops to speak about their part, assumptions, and challenges and to listen to the perspectives and needs of others. The goal of the workshops will be: to facilitate communication and understanding among participants, to orient new participants to the curriculum and ethno-translation process, and to identify opportunities for improving development and use of the curriculum. MCWB will support facilitation of workshops.

“When starting school, children find themselves in a new classroom, many of their classmates are strangers, as is their teacher. This type of structured way of learning is alien to them. In addition, for the Maya and other indigenous groups there is an abrupt change in the language of interaction, so the situation can be quite complicated. However, by using the student’s home language, schools can help children navigate this new environment and bridge their learning at school with their learning experience’s they bring from home.”³³

Felicita Cantun – Puks’ik’al Maya Group



As we continue formalizing our processes and procedures, we aim to build the institutional capabilities to sustain relevance and utility of marine conservation science and TEK in education and practice among the communities we serve. Our maturity goal is to reach a standardized and repeatable process that may allow us to work more efficiently while also improving the quality and authenticity of the curriculum our collaborators develop. Our workshops are designed to guide and us and our partner communities to this goal. Here is a description of the workshops we’ll support in the pilot communities.

- **Ethno-translator methodology review workshops:** defining and improving the methods through their practice and in devising locally appropriate implementation strategies, determining which fit more universally to all communities and where divergence with locally specificity is valuable
- **TEK community workshops:** document and validate the language used to represent their understanding of the marine ecology and species and to validate the new concepts and neologisms introduced by the ethno-translators. Does the reader’s meaning and message resonate? What may be improved or changed for improved authenticity and accuracy and understanding?
- **Workshops for educators and learners:** Introduce the curriculum to educators and discuss strategies for incorporating into classrooms and existing annual curriculum plans; improve quality and utility of the content, ease of use in classrooms, and assess value to teachers and students relative to the learning objectives of conservation science and its practical application.
- **Ethno-translator reflective assessment workshops:** informed by the TEK and Educator workshops, review feedback and topics raised to adapt and adjust for improved efficiency and quality; re-baseline the methods and protocols for the next topics and units.

We recognize the potential our methodology has for developing more effective conservation science curriculum for other geographic, cultural, linguistic, and topical contexts; however, our immediate focus remains on topics relevant to the linguistic communities across the greater Caribbean Basin. Even within this cultural-geographic region, the scope of our work is sufficiently large and promises investment of several years to complete. Your support may influence our pace and scope in completing and moving beyond the Caribbean to *uncover and enhance Treasures in your community*. Read on to discover how you can learn more about our work and contribute to it.

³³ Thigpen and Cahun 2018



Your part:

Learn more, contribute, and support our work and mission

The purpose of embarking on this endeavor is to promote and generate knowledge concerning the development of behaviors to ensure enduring sustainability for TEK and linguistic communities and their environments...building and supporting communities who live with and by the sea and her resources. The work to accomplish these goals is not small; how do we get it done?

Up to now we've relied heavily on volunteers sharing their time and skills. We have received donations through our website and from other individual contributors through their employer's charitable giving programs. As our work continues to pick up momentum we are looking to obtain more resources to enable our plan and the pace at which we execute it.



For the curious mind

Visit our website and browse around to learn more about who we are and what we are doing. [Marine Conservation without Borders](#) would love to have you as a partner in our project. Our first three eBooks will all be available on the MCWB website in our free [Digital Library](#), where you can download our latest materials. Our *Mangrove Ecosystems* book is available to download in several language combinations now!

Motivate your interest to action

We seek and accept support in mainly two ways. We draw heavily, nearly exclusively, on volunteers with knowledge and skills in areas relevant to producing the *Treasures* ethno-translation methodology and curriculum units. We have a small supply of financial support to help in more efficiently producing our products, with dedicated and supported professionals and interns.

We aim to continue relying on volunteers, to develop competency for consistent grant funding across private and public sources, and to grow our source of individual based contributions and sponsorships.

Stop by our [donation](#) page. For larger donations or questions, email info@marinefrontiers.org. Invest in our vision to develop and promote conservation science education throughout the Caribbean and you may have a role in determining what *Treasure* is created next. Remember to check with your employer about matching grant or giving programs, it could double your individual impact!

Sustaining institutional support

We will continue to rely on and expand our volunteer base, what has developed into a reliable foundation taking us to our current state. We have also started to seek funding through granting agencies, again made possible from the generous contributions of time from our volunteer base. With your help, we can maintain and grow from our current momentum and generous support as we develop the next topics in the *Treasures* collection. What will the next *Treasure* be? Do you want to help? If you are reading still you probably do, in not also share an interest in our mission and goals.





Financial contributions and grants will be used in supporting the activities associated with the three components of the plan above: mature methodology, develop curriculum, and promote adoption of the curriculum by supporting communities. Together, these resources and the output are woven in supporting an efficient operating model to manage the delivery of the *Treasures* collection through *Marine Conservation without Borders*.

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